IO-69 LABVIEW LIBRARY
USER MANUAL

Rel. 01.01.0001
(Hardware code: IO-69LIBRARY)

CONCEIVING
PLANNING
DEVELOPMENT
IN SCIENTIFIC
ELECTRONICS

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Tel. (+39) 02 39449519 Fax (+39) 02 700403170
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This guide contains instructions and technical features of the IO-69 LABVIEW LIBRARY.
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Fax (+39) 02 700403170
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REVISION HISTORY

Manual revision history

Revision/ Date	Change description	Author
01.00.0000 December, 2006	Released first version	Dugato S.
01.01.0000 January, 2009	User manual update based on software upgrade	Pizzocolo/Rivolta
01.01.0001 June, 2015	Update document layout	Bottaccioli M.

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IO-69 LABVIEW LIBRARY

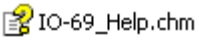
LabVIEW development tool gives the feasibility of IO-69 device remote control. This control can be achieved through nine DLL functions implemented in *LabVIEW* and included in the library LabView_IO-69_Library: to use them it is necessary to install the LabVIEW RunTime Engine 7.1 and NI VISA RunTime 4.20 (or later) if you want to use *VCP* communication mode. The IO-69 Library is compatible with *LabVIEW 7.1* and any later versions.
Thanks to these functions it is no necessary to know the details of the communication protocol and the application development is quick and easy.
The functions have two development levels:

- *IO-69_Low_Level_Communication.llb* which contains four functions for the connection with the IO-69 card.
- *IO-69_Application.llb* which contains five higher level functions (realized through the use of the previous ones) which allow the assignment of the commands recognized by the device.

Use *IO-69_Application.llb* for application development, while *IO-69_Low_Level_Communication* to maximize performances.

	Function	Properties
IO-69_Low_Level_Communication.llb	*Close_Device.vi*	Closes the connection established with one of the available protocols.
	Open_Device.vi	Opens the connection with one of the available protocols.
	Write&Read.vi	Sends and receives ASCII characters.
	Write_Command.vi	Sends ASCII characters.
IO-69_Application.llb	*Close_dialogue.VI*	Ends the communication with the IO-69 card.
	Read.vi	Interprets characters sent by the device.
	Return_Info.vi	Returns the S/N list of connected devices.
	Send_Command.vi	Imparts the commands implemented on the device.
	Start_dialogue.vi	Starts dialogue session with the IO-69 card.

LabView_IO-69_Library is provided with a help file, *IO-69_Help.chm*.
The help explains deeper all the nine functions in the library.
The help of every function is also available in the LabVIEW *Context Help*.



Graphical representations are realized to make the user easily understanding how they work.
They are available directly in the tool in which they were build. Next figure displays the help of the library.

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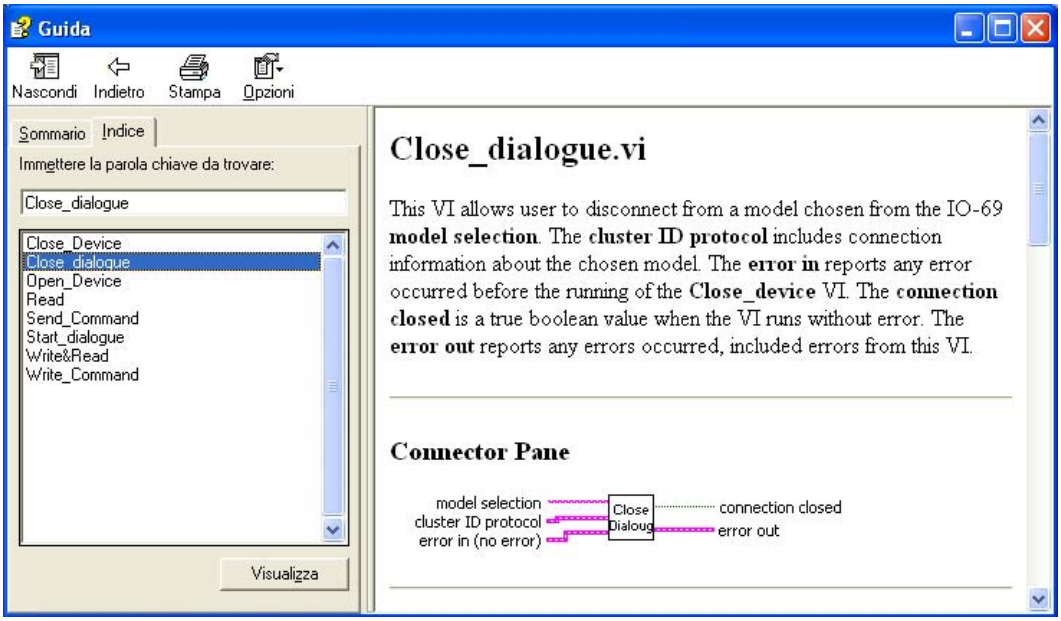
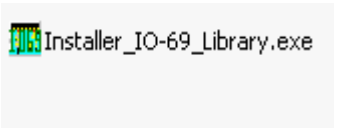

Guida
Nascondi
Indietro
Stampa
Opzioni
Sommario
Indice
Immettere la parola chiave da trovare:
Close_dialogue
Close_Device
Close_dialogue
Open_Device
Read
Send_Command
Start_dialogue
Write&Read
Write_Command
Visualizza
Close_dialogue.vi
This VI allows user to disconnect from a model chosen from the IO-69 model selection. The cluster ID protocol includes connection information about the chosen model. The error in reports any error occurred before the running of the Close_device VI. The connection closed is a true boolean value when the VI runs without error. The error out reports any errors occurred, included errors from this VI.
Connector Pane
model selection
cluster ID protocol
error in (no error)
Close Dialoug
connection closed
error out

Figure 1: *LabView* functions help.

INSTALLATION

Run *Installer_IO-69_Library.exe* to install all files of LabView_IO-69_Library. By default, all these files will be placed in the folder *C:\IPSES_Lib\IO69* and its subfolder. In figure 2 you can see how the main folder appear. To avoid any problem, do not move *FTD2XX.dll* and *IO-69_Help.chm* from directory *C:\IPSES_Lib\IO69 and C:\IPSES_Lib\LabView_IO-69_Library* respectively.



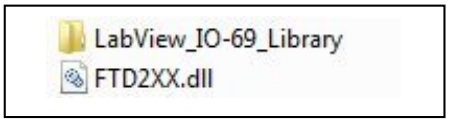


Figure 2: installed files.

NI-VISA is a library of functions you can use to communicate with GPIB, serial, VXI, and computer-based instruments in *LabVIEW*. It is no necessary using separate I/O palettes to program an instrument. For instance, some instruments ship with a choice for the type of interface. If LabVIEW instrument driver was written with functions from the GPIB palette, usually the instrument driver VIs would not work for an instrument with a serial port interface: VISA solves this problem by providing a set of functions working for any type of interface. Therefore, VISA is used as the I/O language in all LabVIEW instrument drivers. NI-VISA is automatically installed.

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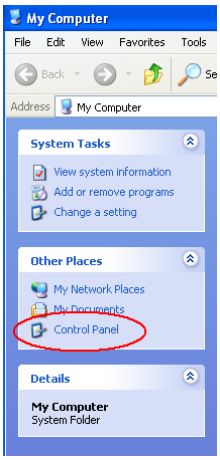
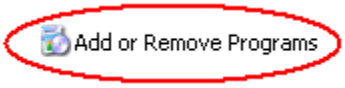
REMOVAL

To correctly remove IO-69_Library, follow the instructions listed below.

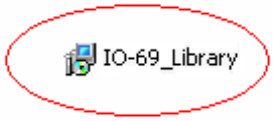


1. From Desktop, click "My Computer" icon and choose "Control Panel".



2. Click "Add or Remove Programs" from the resource list displayed.

3. From program installed list select "IO-69_Library" and proceed removal with "Change/Remove".



4. Follow the instructions displayed.

5. Delete the folder *C:\IPSES_Lib*.

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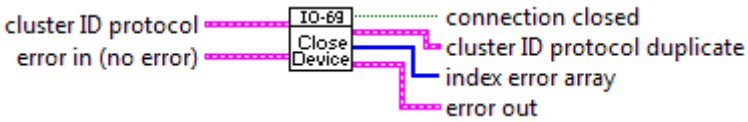
LOW LEVEL FUNCTIONS

Close_Device.vi

This VI allows user to close connection from IO-69 device. The connection description is enclosed in the **cluster ID protocol** and it is automatically detected. The **error in** reports any error occurred before the running of **Close_Device** VI; the **connection closed** is a true boolean value when the VI runs without error. The **cluster ID protocol duplicate** reports only the failed closure ID while the **index error array** lists the corresponding devices indexes. The **error out** reports any errors occurred, included errors from this VI.

Connector Pane



Controls and Indicators

cluster ID protocol

The **cluster ID protocol** encloses the currently used communication protocol.

Handle array

The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle

The **Handle** is the D2XX library identificator to address an univoque device.

VISA resource array

The **VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name

The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error in (no error)

The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in case of errors from other VIs.

status

The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code

The **code** input identifies the error or warning.

source

The **source** string describes the origin of the error or warning.

connection closed

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The **connection closed** refers about correct ending of the connection.

cluster ID protocol duplicate
The **cluster ID protocol duplicate** encloses the copy of currently used communication protocol.

dup Handle array
The **dup Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

dup VISA resource array
The **dup VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

index error array
The **index error array** lists all the array indexes of the failed devices.

index error device
The **index error device** reports the array index of the failed device.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
-310	Impossible to close IO-69 USB D2XX [#index]
-311	Impossible to close IO-69 USB VCP [#index]
-312	Impossible to close IO-69 USB [#index VCP + #index D2XX]

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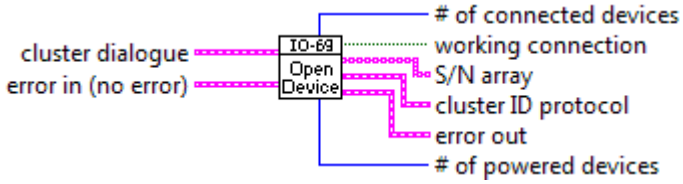
Open Device.vi

This VI allows user to open connection to IO-69 device, chosen by the **dialogue protocol**. The **VISA resource array** assigns the communication COM ports. The **cluster ID protocol** encloses communication protocol description. The **error in** reports any error occurred before the running of **Open device** VI. The **S/N array** reports each serial numbers devices connected both VCP that in D2XX mode. The **# of connected devices** reports how many devices are simultaneously connected, while the **# of powered devices** reports how many devices are supplied by USB ports. The **working connection** is a true boolean value when the VI runs without error. The **error out** reports any errors occurred, included errors from this VI.

Connector Pane



Controls and Indicators

cluster dialogue

The **cluster dialogue** encloses the protocol for the session and the defined VISA array.

- **dialogue protocol**
  The **dialogue protocol** relates about the chosen standard of communication.
- **VISA resource array**
  The **VISA resource array** is the COM port addresses collection used in VCP connection mode.
  - **VISA resource name**
    VISA resource name specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error in (no error)

The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in case of errors from other VIs.

- **status**
  The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
- **code**
  The **code** input identifies the error or warning.
- **source**
  The **source** string describes the origin of the error or warning.

working connection

The **working connection** refers about correct working of the connection.

cluster ID protocol

The **cluster ID protocol** encloses the currently used communication protocol.

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Handle array
The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

VISA resource array
The **VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

# of connected devices
The **# of connected devices** relates about the effective number of successfully connected devices both VCP than in D2XX mode.

# of powered devices
The **# of powered devices** relates about the number of electrically connected devices both VCP than in D2XX mode.

S/N array
The **S/N array** lists the S/N of each device opened.

String
The **string** reports the serial number code.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
320	Warning: no device founded
-320	Error to connect IO-69 USB D2XX device
-321	Error to connect IO-69 USB D2XX device

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-322	Error to open IO-69 USB D2XX device
-323	Error to set D2XX baud rate
-324	Error to set D2XX data characteristics
-325	Error to set D2XX flow control
-326	Error to set D2XX time out

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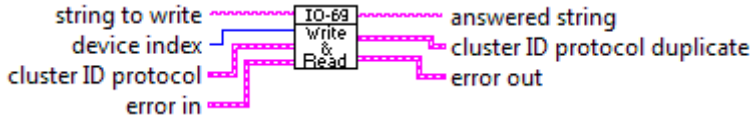
Write&Read.vi

This VI allows user to send request to IO-69 device. Questions have to be defined in **string to write** to obtain answers in **answered string**. The **cluster ID protocol** encloses communication protocol description. The **device index** address the related device D2XX or VCP mode, depends on working protocol previously opened. The **cluster ID protocol duplicate** is a duplicate of the **cluster ID protocol**. The **error in** reports any error occurred before the running of **Write&Read** VI. The **error out** reports any errors occurred, included errors from this VI.

Connector Pane



Controls and Indicators

string to write
The **string to write** contains strings to be passed to IO-69 device.

device index
The **device index** allows to select an ID from the **cluster ID protocol**.

cluster ID protocol
The **cluster ID protocol** encloses the currently used communication protocol.

- Handle array
  The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.
  - Handle
    The **Handle** is the D2XX library identificator to address an univoque device.
- VISA resource array
  The **VISA resource array** is the COM port addresses collection used in VCP connection mode.
  - duplicate VISA resource name
    The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error in
The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in case of errors from other VIs.

- status
  The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
- code
  The **code** input identifies the error or warning.
- source
  The **source** string describes the origin of the error or warning.

answered string

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The **answered string** contains strings from IO-69 device.

cluster ID protocol duplicate
The **cluster ID protocol duplicate** encloses the copy of currently used communication protocol.

dup Handle array
The **dup Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

dup VISA resource array
The **dup VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
-330	Write error to IO-69 USB D2XX
-331	Read error from IO-69 USB D2XX
-332	Device index out of range
-333	Device not founded, empty ID array
-334	ID protocol conflict

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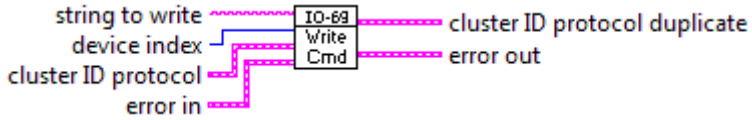
Write_Command.vi

This VI allows user to send command to IO-69 device. Commands have to be sent in the **string to write**. The **cluster ID protocol** encloses communication protocol description. The **cluster ID protocol duplicate** is a duplicate of the **cluster ID protocol**. The **device index** address the related device in D2XX or VCP dialogue mode, depends on protocol previously opened. The **error in** reports any error occurred before the running of **Write_Command** VI. The **error out** reports any errors occurred, included errors from this VI.

Connector Pane



Controls and Indicators

string to write
The **string to write** contains strings to be passed to IO-69 device.

device index
The **device index** allows to select an ID from the **cluster ID protocol**.

cluster ID protocol
The **cluster ID protocol** encloses the currently used communication protocol.

- Handle array
  The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.
  - Handle
    The **Handle** is the D2XX library identificator to address an univoque device.
- VISA resource array
  The **VISA resource array** is the COM port addresses collection used in VCP connection mode.
  - duplicate VISA resource name
    The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error in
The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in case of errors from other VIs.

- status
  The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
- code
  The **code** input identifies the error or warning.
- source
  The **source** string describes the origin of the error or warning.

cluster ID protocol duplicate

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The **cluster ID protocol duplicate** encloses the copy of currently used communication protocol.

dup Handle array
The **dup Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

dup VISA resource array
The **dup VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
-330	Write error to IO-69 USB D2XX
-332	Device index out of range
-333	Device not founded, empty ID array
-334	ID protocol conflict

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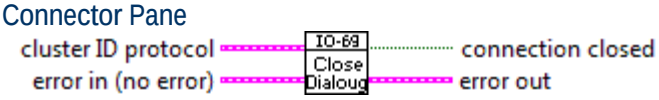
APPLICATION FUNCTIONS

Close_dialogue.vi

This VI allows user to disconnect from the IO-69 device. The **cluster ID protocol** includes connection protocol information. The **error in** reports any error occurred before the running of the **Close_Device** VI. The **connection closed** is a true boolean value when the VI runs without error. The **error out** reports any errors occurred, included errors from this VI.

Connector Pane



Controls and Indicators

cluster ID protocol
The **cluster ID protocol** encloses the currently used communication protocol.

- Handle array
  The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.
  - Handle
    The **Handle** is the D2XX library identificator to address an univoque device.
- VISA resource array
  The **VISA resource array** is the COM port addresses collection used in VCP connection mode.
  - duplicate VISA resource name
    The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error in (no error)
The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in case of errors from other VIs.

- status
  The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
- code
  The **code** input identifies the error or warning.
- source
  The **source** string describes the origin of the error or warning.

connection closed
The **connection closed** refers about correct ending of the connection.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

- status

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The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

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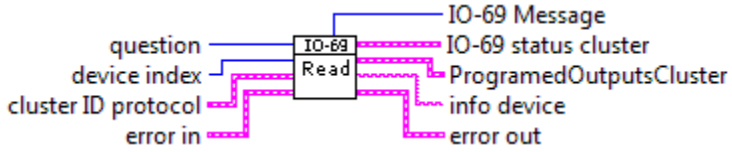
Read.vi

This VI allows user to send requests to IO-69 device. The **question** parameter contains a list of allowed request. The **IO-69 Message**, the **IO-69 Status cluster** , the **ProgramedOutputsCluster** and the **info device** are variables containing answers to **question** requests sent about device status and information. The **cluster ID protocol** encloses communication protocol description. The **device index** address the related device in D2XX or VCP mode, depends on working protocol previously opened. The **error in** reports any error occurred before the running of **Read** VI. The **error out** reports any errors occurred, included errors from this VI (i.e. illegal question).

Connector Pane



Controls and Indicators

question
The **question** contains allowed request to the device.

cluster ID protocol
The **cluster ID protocol** encloses the currently used communication protocol.

Handle array
The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

VISA resource array
The **VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

device index
The **device index** allows to select an ID from the **cluster ID protocol**.

error in
The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in case of errors from other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source

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The **source** string describes the origin of the error or warning.

IO-69 Message
The **IO-69 Message** gives information about device status.

IO-69 status cluster

- Error
  The BIT 0 **Error** reports errors.
- In 1
  The BIT 1 **In 1** relates about input 0 status.
- In 2
  The BIT 2 **In 2** relates about input 1 status.
- In 3
  The BIT 3 **In 3** relates about input 2 status.
- In 4
  The BIT 4 **In 4** relates about input 3 status.
- In 5
  The BIT 5 **In 5** relates about input 4 status.
- In 6
  The BIT 6 **In 6** relates about input 5 status.
- Out 1
  The BIT 7 **Out 1** relates about output 0 status.
- Out 2
  The BIT 8 **Out 2** relates about output 1 status.
- Out 3
  The BIT 9 **Out 3** relates about output 2 status.
- Out 4
  The BIT 10 **Out 4** relates about output 3 status.
- Out 5
  The BIT 11 **Out 5** relates about output 4 status.
- Out 6
  The BIT 12 **Out 6** relates about output 5 status.
- Out 7
  The BIT 13 **Out 7** relates about output 6 status.
- Out 8
  The BIT 14 **Out 8** relates about output 7 status.
- Out 9
  The BIT 15 **Out 9** relates about output 8 status.

ProgramedOutputsCluster
The **ProgramedOutputsCluster** reports the logic conditions to be veified in order to switch on each one of the nine outputs of the IO-69 device.

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[1]

string0
Logical input conditions to switch on output 0.

This boolean value is true when output 0 is programmed.

[2]

string1
Logical input conditions to switch on output 1.

This boolean value is true when output 1 is programmed.

[3]

string2
Logical input conditions to switch on output 2.

This boolean value is true when output 2 is programmed.

[4]

string3
Logical input conditions to switch on output 3.

This boolean value is true when output 3 is programmed.

[5]

string4
Logical input conditions to switch on output 4.

This boolean value is true when output 4 is programmed.

[6]

string5
Logical input conditions to switch on output 5.

This boolean value is true when output 5 is programmed.

[7]

string6
Logical input conditions to switch on output 6.

This boolean value is true when output 6 is programmed.

[8]

string7
Logical input conditions to switch on output 7.

This boolean value is true when output 7 is programmed.

[9]

string8
Logical input conditions to switch on output 8.

This boolean value is true when output 8 is programmed.

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info device
The **info device** gives information about IO-69 device release.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
-360	Unknown request
-361	No answer from device

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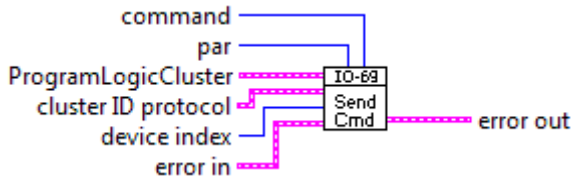
Send_Command.vi

This VI allows user to send command to IO-69 device. The **command** variable contains a list of allowed commands to IO-69 device. The **par** variable allows to set-out parameters to be used with **command**. The **ProgramLogicCluster** refers Output (from 0 to 8) switch on when input condition **In1**, **In2**, **In3**, **In4**, **In5**, **In6** are verified. The **cluster ID protocol** contains communication protocol description. The **device index** address the related device in D2XX or VCP mode, depends on protocol previously opened. The **error in** reports any error occurred before the running of **Send_Command** VI. The **error out** reports any errors occurred, included error from this VI.

Connector Pane



Controls and Indicators

command
The **command** contains allowed commands to the device.

par
The **par** receives parameters for commands.

ProgramLogicCluster
The **ProgramLogicCluster** refers **Output** (from 0 to 8) switch on when input conditon **In1**, **In2**, **In3**, **In4**, **In5**, **In6** are verified.

- Output
  Selected output.
- In1
  Input 0.
- In2
  Input 1.
- In3
  Input 2.
- In4
  Input 3.
- In5
  Input4.
- In6
  Input 5.

cluster ID protocol
The **cluster ID protocol** encloses the currently used communication protocol.

- Handle array

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The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

VISA resource array
The **VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

device index
The **device index** allows to select an ID from the **cluster ID protocol**.

error in
The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in the case of errors from other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
-370	Unknown command
-371	Invalid parameter

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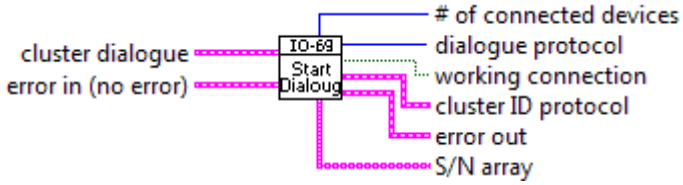
Start_dialogue.vi

This VI allows to start dialogue with a IO-69 model chosen by a list housed in the **communication protocol**, enclosed in the **cluster dialogue**. The **VISA resource array** is an array of variable through which the COM ports have to be passed to establish connection via VCP (Virtual Com Port). The **working connection** returns true value if the procedure is successfully finished. The **dialogue protocol** indicates the protocol of dialogue related to the selected model. The **cluster ID protocol** encloses communication protocol description. The **# of connected devices** returns the number of connected devices working correctly. The **S/N array** lists the S/N of each device successfully opened. The **error in** reports any error occurred before the **Start_dialogue** VI running; possible errors appearing in this VI, like other occurred before, are reported in the **error out**.

Connector Pane



Controls and Indicators

cluster dialogue
The **cluster dialogue** encloses the protocol for the session and the defined VISA array.

- **communication protocol**
  The **communication protocol** contains the list of IO-69 models. Each model has its own dialogue standard.
- **VISA resource array**
  The **VISA resource array** is the COM port addresses collection used in VCP connection mode.
  - **VISA resource name**
    VISA resource name specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error in (no error)
The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in the event of errors from other VIs.

- **status**
  The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
- **code**
  The **code** input identifies the error or warning.
- **source**
  The **source** string describes the origin of the error or warning.

working connection
The **working connection** refers about the correct working of connection.

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dialogue protocol
The **dialogue protocol** relates about the model standard of communication.

cluster ID protocol
The **cluster ID protocol** encloses the currently used communication protocol.

Handle array
The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

VISA resource array
The **VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

S/N array
The **S/N array** lists the S/N of each device opened.

String
The **string** reports the serial number code.

# of connected devices
The **# of connected devices** relates about the effective number of successfully connected devices both VCP that in D2XX mode.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
-380	Impossible connection to the chosen device

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Return_Info.vi

This VI returns to user the S/N list of connected device in **S/N array**. The **cluster ID protocol** encloses communication protocol description and its sensing is automatically done. The **duplicate cluster ID protocol** is a duplicate of the **cluster ID protocol**. The **error in** reports any error occurred before the running of **Return_Info**. The **error out** reports any errors occurred, included errors from this VI.

Connector Pane

Controls and Indicators

cluster ID protocol
The **cluster ID protocol** encloses the currently used communication protocol.

Handle array
The **Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

VISA resource array
The **VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error in (no error)
The **error in** cluster can accept error information wired from VIs previously called. Use this information to select functionalities to be bypassed in case of errors from other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source
The **source** string describes the origin of the error or warning.

S/N array
The **S/N array** lists the S/N of each device opened.

String
The **string** reports the serial number code.

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cluster ID protocol duplicate
The **cluster ID protocol duplicate** encloses the copy of currently used communication protocol.

dup Handle array
The **dup Handle array** contains connection identificators of every successfully opened devices connected via D2XX library.

Handle
The **Handle** is the D2XX library identificator to address an univoque device.

dup VISA resource array
The **dup VISA resource array** is the COM port addresses collection used in VCP connection mode.

duplicate VISA resource name
The **VISA resource name** specifies the resource to be opened. This control also specifies session and class. It is to be used with the serial protocol.

error out
The **error out** cluster passes error or warning information out of a VI to be used by other VIs.

status
The **status** boolean is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

code
The **code** input identifies the error or warning.

source
The **source** string describes the origin of the error or warning.

Error code

Code	Description
-390	Error on IO-69 USB D2XX device [#index]
-391	Error on IO-69 USB VCP device [#index]
-392	Empty ID arrays: devices not founded
-393	Error on IO-69 USB VCP (D2XX) device [#index]

ERROR OUT NOTE

For every Error out presented in the previous sections is enable the pop-up option Explain Error (or Explain Warning) giving further information about the error displayed.

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USING FUNCTIONS

Every VI in *LabVIEW* is constituted by a *Front Panel* and a *Block Diagram*. The *Front Panel* contains all elements linked together as described graphically in the *Block Diagram*. When *LabVIEW* is running, you can open IO-69 library functions from the *Block Diagram*: select Window->Show Functions Palette (see figure 3).
The IO-69 Library is compatible with *LabVIEW 7.1* or any later version.

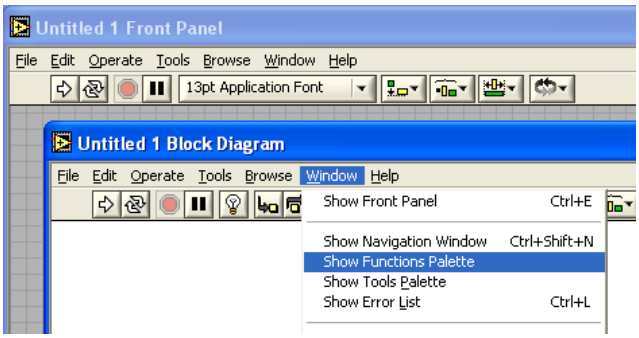
Untitled 1 Front Panel
File Edit Operate Tools Browse Window Help
13pt Application Font
Untitled 1 Block Diagram
File Edit Operate Tools Browse Window Help
Show Front Panel Ctrl+E
Show Navigation Window Ctrl+Shift+N
Show Functions Palette
Show Tools Palette
Show Error List Ctrl+L

Figure 3: how to run *function palette*.

Click Select a VI... button from the *Function Palette,* then insert the path *C:\IPSES_Lib*.

Figure 4: Select a VI... button of *Function Palette*.

The folder C:\IPSES_Lib\IO69\LabView_IO-69_Library contains IO-69_ Low_Level_Communication.llb and IO-69_Application.llb. Copy and paste LabView_IO-69_Library in the folder National Instruments\LabVIEW x.x\user.lib: by this way, when you run LabVIEW 7.1 or any later version you can utilize LabView_IO-69_Library from user libraries palette.

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Figure 5: how utilize IO-69_Library from user libraries palette.

Next figure 6 shows an example VI to connect IO-69 device (from C:\IPSES_Lib\IO69\Labview_IO-69_Library run Application_Library_Example.vi or Low_Level_Library_Example.vi).

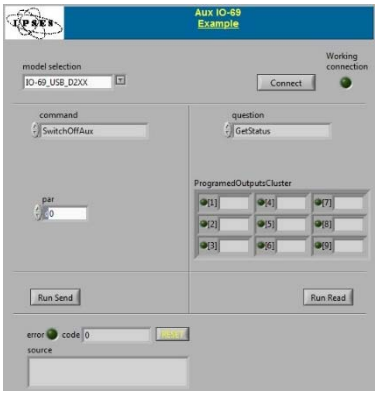

Figure 6: example VI *Front Panel*.

This example VI has been implemented with the use of the functions included in IO-69 library: figure 7 displays its *Block Diagram*.

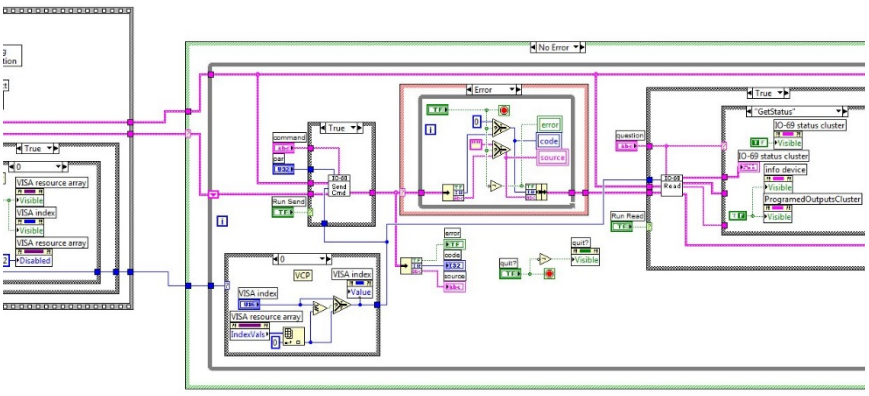

Figure 7: example VI *Block Diagram*.

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IPSES S.r.l.

Research and development office:
Via Suor Lazzarotto, 10
20020 Cesate (MI)
Italy

tel. (+39) 02 39449519 - (+39) 02 320629547
fax (+39) 02 700403170
e-mail: info@ipses.com
http://www.ipses.com

SUPPORT INFORMATION

The customer is at liberty to contact the relevant engineer at IPSES S.r.l. directly.

Telephone	:	(+39) 02 39449519
		(+39) 02 320629547
Fax	:	(+39) 02 700403170
Email	:	support@ipses.com

PROBLEM REPORT

The next page is a standard template used for reporting system problems. It can be copied and send as a fax. Alternative bugs may be reported by emails, in this case please insure that the mail contains similar information listed in the *Engineering Problem Report* form.

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ENGINEERING PROBLEM REPORT

Problem describer

Name			**IPSES s.r.l.** **Via Suor Lazzarotto, 10** **Cesate (MI)** **Italy** **Fax (+39) 02 700403170** **e-mail *support@ipses.com***
Company			
Date	Tel.	Fax	

Product

Name	Version	Serial No.

Report Type (bug, change request or technical problem)

Major bug	☐	Urgency:	
Minor bug	☐	High	☐
Change request	☐	Medium	☐
Technical problem	☐	Low	☐

Problem Description

Reproduction of Problem

IPSES s.r.l. Action notes

Received by	Date	Report No.	Action

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(Product code IO-69LIBRARY Rel. 01.01.0001)

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Via Suor Lazzarotto, 10
20020 Cesate (MI) - ITALY
Tel. (+39) 02 39449519 – (+39) 02 320629547
Fax (+39) 02 700403170
e-mail: info@ipses.com
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